

**[0326]** Conduit

**[0327]** The Palm Computing HotSync Manager oversees the process of synchronizing data. The handheld organizer uses a conduit to transfer data to and from the user's PC. However, with QUICKCHECK, data can only be transferred one way—from the handheld organizer to the PC. This allows the PC to unload data from the handheld and free up memory.

**[0328]** Customization

**[0329]** Conduit customization is achieved by accessing the HotSync Manager<sup>6</sup> by right clicking the icon located in the bottom right portion of the PC screen and choosing Custom. Currently, the only options are to allow the conduit to transfer data from the handheld organizer to the PC or to disable the conduit altogether. To transfer data, select either the Synchronize the files or the Handheld overwrites Desktop option. To disable the conduit, select the Do Nothing option. The conduit does nothing in the Desktop overwrites handheld mode because data can only be transferred one way—from the handheld organizer to the PC.

**[0330]** Data

**[0331]** The conduit transfers three types of information from the handheld organizer to the PC—equipment, fault and trip. It creates and maintains three “globally accessible” files, one for each type of data. The files are named equip.txt, faults.txt and trips.txt. Each file is appended every time a HotSync process occurs, regardless of which user performs the process. This is different from what normally happens during HotSync synchronization; usually the system separates information by user.

**[0332]** In addition to appending new information onto the end of these files, backup versions are maintained, in case something catastrophic happens during a given HotSync process.

**[0333]** Upon a successful synchronization of QUICKCHECK data, the conduit instructs the handheld organizer to remove the downloaded fault and trip records from the handheld organizer, freeing memory for future downloads or other application data. As a result, all fault and trip data older than the last synchronization is not available to be examined on the handheld organizer, only on the PC.

**[0334]** Location

**[0335]** The location of the HotSync output files are as follows:

**[0336]** [palm root8]\quickchk\equip.txt

**[0337]** [palm root]\quickchk\faults.txt

**[0338]** [palm root]\quickchk\trips.txt

**[0339]** The backup copies of these files are stored in the same directory but have the extension .bak instead of .txt.

**[0340]** Formats

**[0341]** The conduit writes in spreadsheet-compatible, comma-separated value (CSV) file format. Each entry or record is a single line with multiple fields, separated by commas. This allows files to be easily imported into a program such as Microsoft Excel for further analysis.

**[0342]** Faults File Format

**[0343]** The faults.txt file has the following format in which the data-type possibilities are numbers or textual strings:

**[0344]** 1,Tuesday Feb. 15, 2000 15:19:27,9799.350000, 362,6,251,128,4,1,Fuel Pump ECM, CAN Communication Error:Volt

Fault File Format	
Field Name	Description
Equipment Identifier	Number—index into equipment table
Download Time Stamp	String—date and time of download from equipment
Total Engine Hours	Number—in hours
Fault Code	Number—Cummins fault code if applicable
Flags	Number Bit Field—0x01 set if PID (vs. SID) 0x02 set if fault active 0x04 set if Cummins fault code is valid
Fault Identifier	Number—PID or SID depending on flag value
Message Identifier	Number—(sometimes referred to as MID)
Fault Mode Indicator	Number—(sometimes referred to as FMI)
Fault Count	Number—number of occurrences of fault
Fault Description	String—text string describing the fault
Time of HotSync	String—date and time of HotSync operation

**[0345]** Trips File Format

**[0346]** The trips.txt file has the following format:

**[0347]** 1,Tuesday Feb. 15, 2000 15:19:27,503,799.35, 1646.0,1148.8,8178.1,0,10.0,5.8,79.0,0, Tue Feb 15 16:16:03 2000

Trip File Format	
Field Name	Description
Equipment Identifier	Number—primary key of this table Other tables use this value.
Download Time Stamp	String—date and time of download from equipment
Valid Flag	Number—(bit field)
Total Engine Hours (0x01 <sup>9</sup> )	Number—in hours
Total Idle Hours (0x02)	Number—in hours
Idle Fuel Used (0x04)	Number—in gallons
Total Vehicle Distance (0x08)	Number—in miles
Unused	Unused
Total PTO Hours (0x20)	Number—in hours
Total Fuel Used (0x40)	Number—in gallons
Max Road Speed Limit (0x80)	Number—in miles per hour
Cruise Control Set Speed (0x100)	Number—in miles per hour
Time of HotSync	String—date and time of HotSync operation

**1-71.** (canceled)

**72.** An vehicle data system for processing and displaying vehicle data transmitted through a bus connector of a data bus on an electronically controlled engine operating in accordance with a predetermined bus protocol, comprising

- a handheld computer including a memory for storing operating system software adapted to operate said